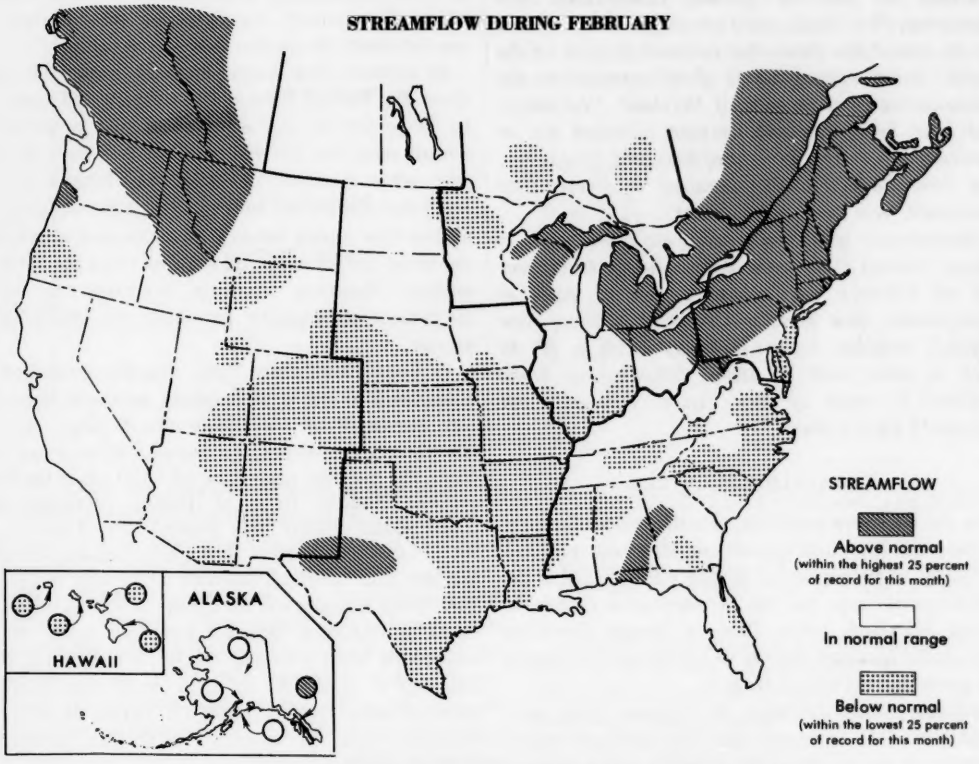
WATER RESOURCES REVIEW for FEBRUARY 1981

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

CANADA
DEPARTMENT OF THE ENVIRONMENT
WATER RESOURCES BRANCH



STREAMFLOW AND GROUND-WATER CONDITIONS

Streamflow generally increased in most areas of the United States east of the Rocky Mountains, and also in Nevada, Oregon, Washington, and Wyoming. Monthly mean flows generally decreased in Alaska, Alberta, British Columbia, Montana, Ontario, and Texas, and were variable elsewhere.

Below-normal streamflow persisted in a large area in and adjacent to Oklahoma, parts of each State in the Southeast Region except Kentucky and West Virginia, and smaller areas located in Arizona, Hawaii, Maryland, Minnesota, New Jersey, New York, Ontario, Oregon, and Wyoming. Monthly and/or daily mean discharges were lowest of record for the month in parts of Arizona and Georgia. Water conservation measures were in effect in parts of Arkansas and Kansas.

Monthly mean flows remained in the above-normal range in parts of Alaska, Alberta, British Columbia, Idaho, Montana, New Mexico, and Texas, and increased into that range in most of the Northeast Region, a large area in and adjacent to Michigan in the Western Great Lakes Region, and parts of Alabama, Florida, and Georgia. Monthly and/or daily mean flows were highest of record for the month in parts of Ontario, Quebec, Alaska, Connecticut, Maine, Massachusetts, Michigan, New Hampshire, New York, and Vermont. Flooding occurred in Indiana, Maine, Michigan, Mississippi, New Hampshire, New York, Ohio, Vermont, and Wisconsin.

Ground-water levels rose in nearly the entire Northeast Region. Levels were above average in parts of Pennsylvania, New York and most of northern New England, and continued below average in much of New Jersey, Delaware, and Maryland's Eastern Shore. In the Southeast Region, levels rose in West Virginia and Georgia, held steady or rose in North Carolina, and mostly rose in Mississippi and Florida. Trends were mixed in Kentucky, Virginia, and Alabama. Levels were above average in Kentucky, below average in Virginia, North Carolina, and Alabama, and above and below average in West Virginia and Florida. In the Western Great Lakes Region, levels rose but were below average in Indiana, and rose and were above average in Ohio. Trends were mixed elsewhere, and levels were above and below average. In the Midcontinent Region, levels declined in North Dakota and Texas, rose in Nebraska and in northern Iowa; trends were mixed elsewhere in the region. Levels were mostly below average. In the West, levels rose in New Mexico, but trends were mixed elsewhere in the region. Levels were mostly below average in Idaho, below average in Montana, Arizona, and New Mexico, and generally mixed with respect to average elsewhere.

New high ground-water levels for February were reached in Maine, Utah, and West Virginia. New February lows occurred in Arizona, Arkansas, Georgia, Idaho, Kansas, Louisiana, Texas, and Utah. A new alltime high was recorded in southern California, and new alltime lows were reached in Idaho and Tennessee.

NORTHEAST

[Atlantic Provinces and Quebec; Delaware, Maryland, New York, New Jersey, Pennsylvania, and the New England States]

Streamflow generally increased throughout the region. Monthly mean flows were above the normal range at most index stations and were highest of record for February in parts of Quebec, Connecticut, New Hampshire, New York, and Vermont, in sharp contrast to the record low flows that occurred in parts of the region during January. Mean flows remained in the below-normal range in parts of Maryland, New Jersey, and New York. Reservoir contents increased but remained below average in parts of Maryland, New Jersey, and New York. Flooding occurred in Maine, New Hampshire, New York, and Vermont.

Ground-water levels rose in nearly the entire region, in a major reversal of the trend during January. Levels near end of February were above average in parts of Pennsylvania, New York, and most of northern New England, including highest February levels in 30–40 years in some wells of Maine. Below-average levels persisted in much of New Jersey, Delaware, and Maryland's Eastern Shore.

STREAMFLOW CONDITIONS

In the Delmarva peninsula, monthly mean discharge of Choptank River near Greensboro, Maryland, increased seasonally to 59 percent of median but remained in the below-normal range for the 2d consecutive month. In central Maryland, mean flow of Seneca Creek at Dawsonville increased sharply to 124 percent of median but was within the normal range.

Monthly mean discharge of Potomac River near Washington, D.C., increased seasonally to 96 percent of median during February and was within the normal range.

In Pennsylvania, streamflow increased seasonally and was above the normal range at all index stations. In the central part of the State, where mean flow of Susquehanna River at Harrisburg was below the normal range and only 21 percent of median during January, flow increased sharply as a result of runoff from heavy rains and snowmelt, was above the normal range, and was over twice the median flow during February.

In southern New Jersey, monthly mean discharge of Great Egg Harbor River at Folsom increased seasonally to 60 percent of median, but remained in the below-normal range for the 4th consecutive month. By contrast, where mean flow of the Delaware River at Trenton was below the normal range and less than one-fourth the median flow during January, flow increased sharply into the above-normal range and was over twice the February median. Reservoir contents increased to about 60 percent of capacity but were still much below average.

In Long Island, New York, monthly mean flow of Massapequa Creek at Massapequa increased seasonally but remained in the below-normal range for the 6th consecutive month. By contrast, in northern New York, the monthly mean flow of 7,120 cfs at the index station, Hudson River at Hadley (drainage area, 1,664 square miles) was highest for February in 60 years of record. Mean flow during January at Hadley was less than 1,000 cfs and only 55 percent of median. Even more dramatic was the change in flow of Schoharie Creek at Prattsville (drainage area, 236 square miles), which rose from a record low January monthly mean discharge of about 30 cfs to a record high February monthly mean flow of 1,900 cfs. Period of record at Prattsville began in November 1902. General flooding

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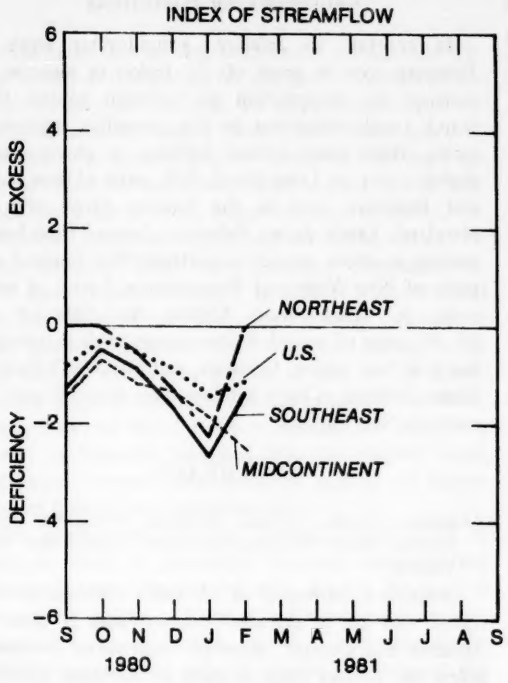

The index of deficient streamflow continued to worsen in the Midcontinent Region from a value of -1.9 in January to a value of -2.5 in February, as low flows persisted in a large area in and adjacent to Oklahoma. Marked improvement was noted in the Northeast and Southeast Regions when runoff from heavy rains reversed the downward trend. The index is computed by multiplying the percent of a region that is deficient by the average duration of deficiency. Thus, the index of streamflow deficiency for the Midcontinent during February decreased to a value of -2.5 when 58 percent (i.e., 0.58) of the area in the Midcontinent Region was deficient for an average duration of -4.3 months. (0.58 X [-4.3] = -2.5)

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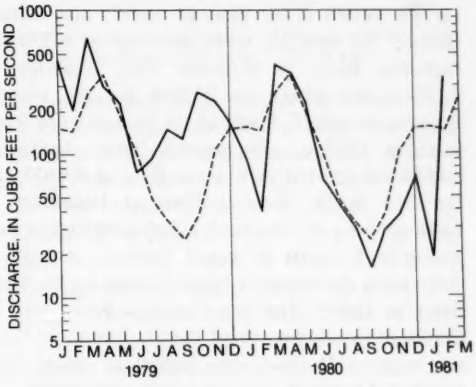
from ice jams in most of eastern New York culminated on February 12 and 13. Particularly hard hit was the city of Port Jervis on the Delaware River, which suffered considerable damage when an ice jam caused the highest flood stage in 78 years of record.

In adjacent Connecticut, where monthly mean flows in January at all index stations were lowest of record for the month, mean flows increased sharply into the above-normal range and varied from 205 to 266 percent of median during February. In the northeastern part of the State, the monthly mean flow of 164 cfs at Mount Hope River near Warrenville (drainage area, 28.6 square miles) was highest for the month in 41 years of record.

Similarly, in Rhode Island, where mean flow in Branch River at Forestdale was only 21 percent of median and lowest of record during January, flow increased sharply as a result of runoff from rains near monthend and was above the normal range in February.

In central Massachusetts, the daily mean discharge of 1,200 cfs on the 28th, at the index station, Ware River at Intake Works, near Barre (drainage area, 96.8 square miles) was highest for February in 54 years of record and the monthly mean flow near Barre was above the normal range for the first time since March 1980. (See graph.)



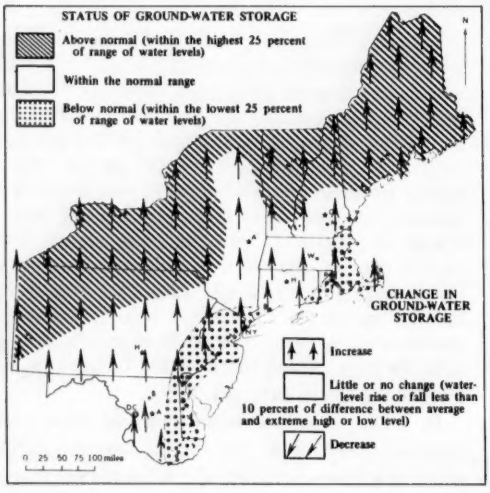
Monthly mean discharge of Ware River at Intake Works, near Barre, Mass. (Drainage area, 96.8 sq mi; 251 sq km)

In central Vermont, where monthly mean flow in Dog River at Northfield Falls (drainage area, 76.1 square miles) was below the normal range and second lowest for period of record during January, flow increased sharply and the monthly mean discharge of 501 cfs and the daily mean discharge of 1,420 cfs on the 20th were highest for February in 47 years of record. Similarly, in west-central New Hampshire, the monthly mean discharge of 4,810 cfs and the daily mean flow of 19,000 cfs on the 21st, in Pemigewasset River at Plymouth (drainage area, 622 square miles) were highest for the month in 78 years of record. Flooding was encountered on many streams in central New England with ice jams causing much of the flooding, especially prior to the rise on February 20.

In Maine, monthly mean flows at index stations increased, contrary to the normal seasonal pattern of decreasing flows, and were above the normal range over the entire State. Runoff from heavy rains and snowmelt around the 10th and again on the 20th produced major peaks over most of the State. These high flows coupled with ice jams produced lowland flooding in many areas in central and southern Maine.

In the Atlantic Provinces, streamflow increased contrary to the normal seasonal pattern of decreasing flow, and was above the normal range. In southern New Brunswick, where mean flow during January at Lepreau River at Lepreau was below the normal range, flow increased sharply to over 3 times the median in February and was above the normal range.

In Quebec, streamflow generally increased, contrary to the normal seasonal pattern, and was above the normal range as a result of high runoff from above-normal precipitation and snowmelt. In the Matane River basin in southeastern Quebec, the monthly mean flow at Matane (drainage area, 636 square miles) of 1,590 cfs and the daily flow of 6,780 cfs on the 23d were highest for the month in 59 years of record. Also in eastern Quebec, the monthly mean discharge of 6,790 cfs in Outardes River at Outardes Falls (drainage area, 7,300 square miles) was highest for the month in 59 years of record. South of the St. Lawrence River in southern Quebec, the monthly mean discharge of 14,600 cfs and the daily mean flow of 49,400 cfs on the 22d in St. Francois River at Hemmings Falls (drainage area, 3,710 square miles) were highest for the month in 55 years of record. Similarly, monthly and daily mean discharges at index stations on St. Maurice River at Grand Mere and Coulonge River near Fort-Coulonge (located north of the St. Lawrence River in southwestern Quebec) were highest of record for the month in 81 and 74 years of record, respectively.



Map shows ground-water storage near end of February and change in ground-water storage from end of January to end of February.

GROUND-WATER CONDITIONS

In contrast to January, ground-water levels in February rose in most of the region in response to recharge by precipitation on unfrozen ground. (See map.) Local exceptions in this prevailing water-level trend, where levels instead declined, or changed only slightly, were on Long Island, N.Y., parts of New Jersey and Delaware, and in the Eastern Shore area of Maryland. Levels during February changed from below average to above average in northern New England and parts of New York and Pennsylvania. Levels of some wells in Maine were highest for February in 30–40 years of record. Below-average levels persisted in much of New Jersey, Delaware, and Maryland's Eastern Shore. Patterns of highs and lows were mixed in parts of southern New England.

SOUTHEAST

[Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia]

Streamflow increased at all index stations in the region; and was in the above-normal range in parts of Alabama and Georgia. Monthly mean flows remained below the normal range in parts of Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia, but no water-supply shortages were reported from any part of the region. Below-normal flows have persisted in parts of Florida for 8 months and in parts of Georgia for 7 of the past 8 months, illustrating the continued lack of precipitation in those areas. Flooding occurred in coastal areas of Mississippi.

Ground-water levels rose in West Virginia and Georgia, held steady or rose in North Carolina, and mostly rose in Mississippi and Florida. Trends were mixed in Kentucky, Virginia, and Alabama. Levels were above average in Kentucky, below average in Virginia, North Carolina, and Alabama, and above and below average in West Virginia and Florida. A new high level for February was reached in West Virginia, a new low for February occurred in Georgia, and a new alltime low was recorded in western Tennessee.

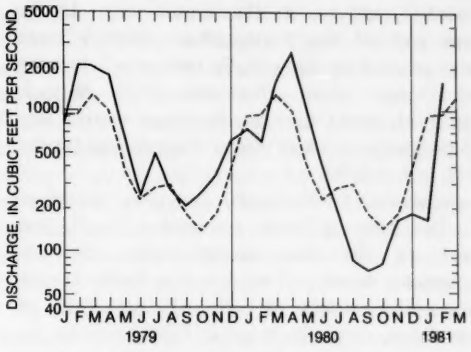
STREAMFLOW CONDITIONS

In Florida, streamflow generally increased but was quite variable throughout the State. For example, in east-central Florida, monthly mean discharge of St. Johns River near Christmas increased, contrary to the normal seasonal pattern, but remained in the below-

normal range for the 8th consecutive month. Cumulative runoff at this station for the first 5 months of the 1981 water year was only 11 percent of normal. By contrast, in northwestern Florida, peak discharges near midmonth on Perdido River at Barrineau Park and Pine Barren Creek near Barth were equal to those of a 10-year flood discharge at those respective sites. Similarly, the maximum daily mean discharge of 9,320 cfs on the 12th in Shoal River near Crestview (drainage area, 474 square miles) was equal to that of a 3-year flood discharge at that site. Also, monthly mean discharge at this station increased into the above-normal range following 2 consecutive months of flow in the below-normal range. In central and southern parts of the State, mean flows of Peace River at Arcadia and Fisheating Creek at Palmdale increased into the normal range, following 7-month and 6-month periods of below-normal flow at these respective sites.

In southeastern Georgia, monthly mean flow of Alapaha River at Statenville increased seasonally but remained below the normal range for the 7th time in the past 8 months and was only 19 percent of median. Cumulative runoff during the first 5 months of the 1981 water year was only 18 percent of median at this index station. By contrast, in the Apalachicola River basin in western Georgia, mean discharge of Flint River near Culloden increased sharply and was in the above-normal range for the first time since May 1980. In the southeastern part of the State, monthly mean flow of Altamaha River at Doctortown (drainage area, 13,600 square miles) also increased sharply and was in the normal range for the first time since July 1980, having been below the normal range in 6 of the past 7 months. The daily mean discharge of 2,950 cfs on the 1st was the lowest for February since records began in October 1931. In extreme northern Georgia, monthly mean flow of Etowah River at Canton (drainage area, 605 square miles) increased sharply and was in the normal range, but the daily mean discharge of 440 cfs on the 1st was lowest for February in 54 years of record.

In central Alabama, where monthly mean flow of Cahaba River at Centreville was lowest of record for January, mean discharge increased sharply and was in the normal range. In the southeastern part of the State, where mean discharge of Conecuh River at Brantley also was lowest of record for January, mean flow increased sharply and was above the normal range for the first time since May 1980. (See graph.) In west-central Alabama, monthly mean flow of Tombigbee River at Demopolis lock and dam near Coatopa also increased sharply but remained in the below-normal range and was about one-half the median discharge for February. In the



Monthly mean discharge of Conecuh River at Brantley, Ala. (Drainage area, 492 sq mi; 1,274 sq km)

extreme northern part of the State, where mean flow of Paint Rock River near Woodville was below the normal range during both December and January, flow increased sharply and was in the normal range but was less than median for the 7th time in the past 8 months.

In central Mississippi, where mean flow of Big Black River near Bovina was lowest of record for January, mean discharge increased seasonally and was greater than the minimum of record for February but remained below the normal range. Cumulative runoff at this station for the first 5 months of the 1981 water year was only 44 percent of median. In the southeastern part of the State, mean flow of Pascagoula River at Merrill increased sharply and was in the normal range again after being below normal in January. In the adjacent basin of Pearl River, monthly mean discharge of Pearl River near Bogalusa, La., near the Mississippi-Louisiana boundary, increased sharply from the below-normal range in January into the normal range for February. Streams in the coastal area experienced considerable flooding near midmonth as a result of runoff from intense rainfall.

In east-central Tennessee, where monthly mean flow of Emory River at Oakdale was lowest of record for January, mean discharge increased sharply but remained below the normal range for the 7th time in the past 9 months. Cumulative runoff at this station since October 1, 1980, was only 22 percent of the median for that 5-month period. In north-central Tennessee, monthly mean flow of Harpeth River near Kingston Springs also increased seasonally but remained in the below-normal range for the 3d consecutive month. Cumulative runoff was only 24 percent of median for the first 5 months of the 1981 water year at this index station. Elsewhere in the State, monthly mean flows also increased but were within the normal range.

In southern Kentucky, where the monthly mean flow of Green River at Munfordville was lowest of record for

January, mean flow increased seasonally, was greater than median, and was in the normal range. In the northern part of the State, where monthly mean discharge of Licking River at Catawba was below the normal range from November 1980 through January 1981, mean discharge increased sharply into the normal range and was greater than median for the first time in 7 months.

In northeastern South Carolina, monthly mean flow of Pee Dee River at Peedee increased seasonally but remained in the below-normal range for the 3d consecutive month and was less than median for the 9th consecutive month. In the adjacent basin of Lynches River, mean discharge at Effingham also increased seasonally and remained below the normal range. In the central part of the State, monthly mean discharge of North Fork Edisto River at Orangeburg also increased seasonally but was less than median for the 4th consecutive month.

In North Carolina, streamflow increased seasonally but remained in the below-normal range for the 3d consecutive month at 3 of the 4 index stations. For example, in the Coastal Plains, monthly mean flow of Contentnea Creek at Hookerton increased, was about one-half the February median discharge, and was below the normal range for the 3d consecutive month and for the 7th time in the past 8 months. In southwestern North Carolina, mean discharge of French Broad River at Asheville increased sharply but remained in the below-normal range as a result of low carryover flow from January and below-normal runoff during February. Similarly, in the central Piedmont, monthly mean flow of South Yadkin River near Mocksville increased but remained in the below-normal range. By contrast, in the eastern Piedmont, where mean discharge of Deep River at Moncure was below the normal range in 6 of the past 7 months, monthly mean flow increased sharply and was in the normal range as a result of increased runoff from rains February 11, 12.

In extreme northern West Virginia, where monthly mean discharge of Potomac River at Paw Paw was lowest of record for January, mean flow increased sharply as a result of runoff from rain late in the month, was greater than median for the first time since September 1980, and was in the normal range. Similarly, in the southeastern part of the State, where monthly mean flow of Greenbrier River at Alderson also was lowest of record for January and was only 11 percent of median, mean flow increased sharply to 93 percent of median and was in the normal range, following 2 consecutive months of below-normal flow. In southwestern West Virginia, monthly mean flow of Kanawha River at Kanawha Falls also increased from the below-normal range in January to the normal range in February, but was less than median for the 5th consecutive month. Daily mean flows near monthend generally were well above normal in all parts of the State.

In Virginia, monthly mean discharge increased seasonally at all index stations but remained below the normal range except in the central part of the State where mean flow of Rapidan River near Culpeper increased sharply into the normal range, following 4 consecutive months of flow in the below-normal range. In southeastern and southwestern parts of the State, mean discharges in Nottaway River near Stony Creek and North Fork Holston River near Saltville, respectively, were 40 percent and 55 percent of median but remained in the below-normal range for the 3d consecutive month. In northern Virginia, monthly mean flow of Slate River near Arvonia increased to 51 percent of median, from 24 percent in January, but remained below the normal range for the 6th consecutive month. Also in northern Virginia, restrictions on water use in Fairfax County were rescinded as a result of increased inflow to Occoquan Reservoir late in the month.

GROUND-WATER CONDITIONS

In West Virginia, ground-water levels rose statewide; levels were near or below average in the southeastern third of the State and above average elsewhere. A new high level for February was reached in the key well at Glenville, Gilmer County, in 27 years of record.

In Kentucky, levels fluctuated seasonally, with little change. However, they were above average in most areas.

In Virginia, levels continued to decline except in Fairfax County in the north. Levels were below average statewide. Precipitation during the month was not sufficient to reverse the continuing non-seasonal downward trend in water levels which, however, were still above the historical lows measured during the droughts of the early 1940's and mid-1960's.

In western Tennessee, the artesian level in the key well in the 500-foot sand near Memphis declined slightly and continued more than 15 feet below average, reaching a new alltime low in 40 years of record.

In North Carolina, levels held steady in the mountains and in the eastern Piedmont, and rose in the western Piedmont and in the Coastal Plain. Levels were below average statewide.

In Mississippi, levels rose in most key wells. In the Jackson metropolitan area, levels in wells in the Cockfield and Sparta Formations rose less than 1 foot. Levels in wells in the Miocene, Graham Ferry and shallow water-table aquifers in southern Mississippi rose from less than 1 foot to almost 2 feet. In northern Mississippi, levels in the Wilcox and Upper Cretaceous

aquifers continued to rise slightly except in areas influenced by pumping, where slight declines were noted. Observation wells in the Mississippi River alluvium along the Yazoo River Basin declined 1 foot to almost 3 feet.

In Alabama, levels showed mixed trends but continued below average.

Levels in Georgia rose as much as 2½ feet in the Piedmont. In the coastal counties, levels in the principal artesian aquifer rose as much as 2 feet. The level in the key well in the water-table aquifer was about 5 feet below average. In the southwest, levels rose up to 2.7 feet. The artesian level in the key well in the Savannah area, on Cockspur Island, despite a rise of about ½ foot, was nevertheless at a new February low in 24 years of record.

In Florida, ground-water levels rose in most areas in the northern part of the State. Levels ranged from less than a foot lower at Pensacola to 2.7 feet higher at Tallahassee by month's end. Levels ranged from about average at Tallahassee to 12.4 feet below average near Mulberry in west-central Polk County. In southeastern Florida, levels rose about ½ foot. Levels ranged from 0.3 foot below average in Palm Beach and St. Lucie Counties to about 0.8 foot above average in Dade County.

WESTERN GREAT LAKES REGION

[Ontario; Illinois, Indiana, Michigan, Minnesota, Ohio, and Wisconsin]

Streamflow decreased in parts of Ontario and Minnesota and increased elsewhere in the region. Monthly mean flows remained in the below-normal range in parts of Ontario, Illinois, and Indiana, and decreased into that range in parts of Minnesota. Mean flows increased into the above-normal range in parts of Ontario, Michigan, Minnesota, Ohio, and Wisconsin. Flooding occurred in parts of Indiana, Michigan, Ohio, and Wisconsin. Monthly and daily mean flows were highest of record for the month in parts of Ontario and Michigan.

Ground-water levels rose but were below average in Indiana, and rose and were above average in Ohio. Trends were mixed elsewhere, and levels were above and below average.

STREAMFLOW CONDITIONS

In west-central Minnesota, monthly mean flow of Buffalo River near Dilworth increased, contrary to the normal seasonal pattern, and was above the normal range for the first time since February 1980. In the northwestern part of the State, flows generally were below the normal range. In northeastern Minnesota, monthly mean flow of Rainy River at Manitou Rapids also increased, contrary to the normal seasonal pattern, was greater than normal, and remained in the normal range for the 4th consecutive month. In central Minnesota, mean flow of Mississippi River at Anoka decreased seasonally and was below the normal range for the first time since August 1980. Storage at monthend in the Mississippi River Headwater System was 10 percent greater than at the end of January, 14 percent greater than a year ago, 11 percent above average, and 20 percent of capacity. In the southwestern part of the State, mean flow of Minnesota River near Jordan increased seasonally but remained in the normal range for the 8th consecutive month.

In western Ontario, monthly mean discharge of English River at Umfreville continued to decrease seasonally and remained in the below-normal range. In the eastern part of the Province, mean flow of Missinaibi River at Mattice also continued to decrease seasonally and was below the normal range for the 3d consecutive month. In extreme southeastern Ontario, the monthly mean discharge of 6,390 cfs in Saugeen River near Port Elgin (drainage area, 1,530 square miles), and the daily mean discharge of 24,540 cfs on the 23d, were highest for February since records began in 1914. This monthly mean discharge also was the largest for any month since April 1979.

In the Upper Peninsula of Michigan, the monthly mean discharge of 155 cfs, and the daily mean of 420 cfs on the 24th, in Sturgeon River near Sidnaw (drainage area, 171 square miles) were highest for February in 41 years of record, as a result of runoff from snowmelt and rainfall during the latter part of the month. In the northern part of the Lower Peninsula, monthly mean flow of Muskegon River at Evart increased and was in the above-normal range for the first time since September 1980, as a result of runoff from midmonth rain and snowmelt. Ice jams on some streams in this part of the State caused flooding. Monthly mean levels of Houghton Lake near Houghton Lake Heights and Lake Mitchell-Cadillac at Cadillac were, respectively, 0.18 foot and 0.33 foot below normal for the month. In the southern part of the Lower Peninsula, mean flow of Red Cedar River at East Lansing increased sharply, was 3½ times median, and was above the normal range.

In the adjacent area of northwestern Ohio, monthly mean flow of Maumee River at Waterville increased sharply, was 2½ times median, and was above the normal range. Similarly, in eastern Ohio, mean flow of Little Beaver Creek near East Liverpool increased sharply into the above-normal range and was

(Continued on page 9.)

SELECTED DATA FOR THE GREAT LAKES, GREAT SALT LAKE, AND OTHER HYDROLOGIC SITES

GREAT LAKES LEVELS

Water levels are expressed as elevations in feet above International Great Lakes Datum 1955

(Data furnished by National Ocean Survey, NOAA, via U.S. Army Corps of Engineers office in Detroit. To convert data to elevations in feet above National Geodetic Vertical Datum of 1929 (NGVD), formerly called sea level datum of 1929, add the following values: Superior, 0.96; Michigan-Huron, 1.20; St. Clair, 1.24; Erie, 1.57; Ontario, 1.22.)

Lake	February 28, 1981	Monthly mean, February		February		
		1981	1980	Average 1900–75	Maximum (year)	Minimum (year)
Superior (Marquette, Mich.)	599.96	599.90	600.62	600.13	601.18 (1975)	598.37 (1926)
Michigan and Huron (Harbor Beach, Mich.)	578.70	578.56	579.14	577.69	579.91 (1952)	575.44 (1964)
St. Clair (St. Clair Shores, Mich.)	574.56	574.19	574.57	572.22	575.39 (1974)	569.88 (1926)
Erie (Cleveland, Ohio)	571.22	570.75	571.51	569.72	572.53 (1973)	567.49 (1936)
Ontario (Oswego, N.Y.)	244.40	243.92	244.31	244.08	246.46 (1952)	241.59 (1936)

LAKE WINNIPEG AT GIMLI, MANITOBA

Alltime high: 718.26 (July 1974). Alltime low: 709.62 (February 1941).	Monthly mean, February				
	1981	1980	Average 1913–80	Maximum (year)	Minimum (year)
Elevation in feet above NGVD:	712.77	713.65	713.36	716.18 (1975)	709.62 (1941)

GREAT SALT LAKE

Alltime high: 4,211.6 (1873). Alltime low: 4,191.35 (October 1963).	February 28, 1981	February 29, 1980	February		
			Average, 1904–80	Maximum (year)	Minimum (year)
Elevation in feet above NGVD:	4,199.85	4,198.85	4,198.40	4,204.70 (1924)	4,191.90 (1964)

LAKE CHAMPLAIN, AT ROUSES POINT, N.Y.

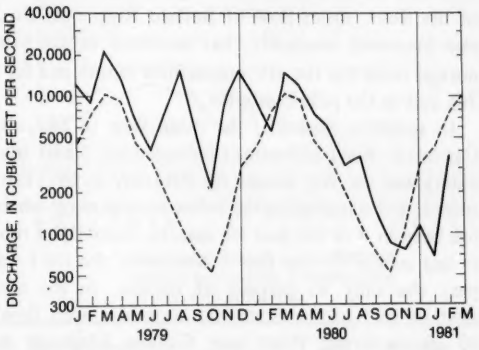
Alltime high (1827–1980): 102.1 (1869). Alltime low (1939–1980): 92.17 (1941).	February 26, 1981	February 29, 1980	February		
			Average, 1939–78	Max. daily (year)	Min. daily (year)
Elevation in feet above NGVD:	98.64	94.30	95.38	98.30 (1973)	93.55 (1948)

FLORIDA

Site	Feburary 1981		January 1981	February 1980
	Discharge in cfs	Percent of normal	Discharge in cfs	Discharge in cfs
Silver Springs near Ocala (northern Florida)	720	95	700	800
Miami Canal at Miami (southeastern Florida)	88	39	0	175
Tamiami Canal outlets, 40-mile bend to Monroe	28	156	24	93

(Continued from page 7.)
211 percent of median. In the central part of the State, monthly mean flow of Scioto River at Higby also increased seasonally but was in the normal range. Storage at month's end in reservoirs in the Scioto River basin upstream from Higby was 138 percent of last month, 95 percent of a year ago, and 77 percent of normal capacity. Storage in reservoirs in the Mahoning River basin upstream from Newton Falls was 183 percent of last month, 154 percent of a year ago, and 88 percent of capacity at month's end. Minor flooding along St. Joseph River and Tiffin River, in northwestern Ohio, was reported by the National Weather Service February 19–24.

In southeastern Indiana, monthly mean flow of East Fork White River at Shoals increased seasonally but remained below the normal range as a result of low carryover flow from January and below-normal runoff in February. (See graph.) Cumulative runoff at this station



Monthly mean discharge of East Fork White River at Shoals, Ind. (Drainage area, 4,927 sq mi; 12,761 sq km)

for the first 5 months of the 1981 water year was only 38 percent of median. The National Weather Service reported minor flooding caused by ice jams along White River in Hamilton County February 17. Elsewhere in the State, streamflow generally increased seasonally but was less than median and was in the normal range.

In Wisconsin, monthly mean flows increased in all parts of the State and were above the normal range in some basins. For example, in the central part of the State, mean discharge of Wisconsin River at Muscoda increased seasonally, was in the above-normal range, and was 26 percent above median. In northwestern Wisconsin, mean discharge of Jump River at Sheldon increased, contrary to the normal seasonal pattern, was above the normal range, and was about 1½ times the February median discharge. In the northeastern part of the State, monthly mean flow of Oconto River near Gillett also increased, contrary to the normal seasonal pattern, was 192 percent of median, and was in the above-normal range. State highways were reported to have been closed late in the month as a result of flooding in Kickapoo River and Pecatonica River basins in southern and western parts of the State, respectively.

In southern Illinois, monthly mean discharge of Skillet Fork at Wayne City increased sharply to 21 percent of median but remained in the below-normal range for the 4th consecutive month. In northern and central parts of the State, monthly mean flows at index stations increased seasonally, remained in the normal range, and were near or slightly above median.

GROUND-WATER CONDITIONS

Ground-water levels in shallow water-table wells in southern Minnesota reversed a 9½-month decline and began rising. However, levels were still 4 feet below average. In the north, ground-water levels continued to decline but at a slower rate than in previous months and were 2 feet below average. In the Minneapolis-St. Paul area, artesian levels in wells tapping the Prairie du Chien-Jordan aquifer rose slightly and were 4 to 7 feet above average. Levels in the deeper Mt. Simon-Hinckley aquifer rose 1 to 3 feet and were 2 to 3 feet above average.

In Wisconsin, levels in observation wells generally continued their seasonal declines except in a few limited areas.

In Michigan, ground-water levels declined in the Upper Peninsula but rose elsewhere. Levels were above average in the southwestern part of the Lower Peninsula but were generally near to below average in other areas.

In Illinois, the level in the shallow well in glacial drift at Princeton, Bureau County, rose slightly more than 3 feet and continued above average by 5 feet.

Levels in wells in Indiana generally rose slightly but continued below normal statewide.

Water levels in key wells in Ohio rose and were above normal.

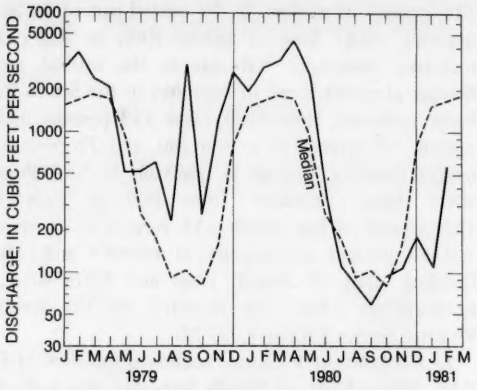
MIDCONTINENT

[Manitoba and Saskatchewan, Arkansas, Iowa, Kansas, Louisiana, Missouri, Nebraska, North Dakota, Oklahoma, South Dakota, and Texas]

Streamflow decreased in Texas and in parts of Missouri, contrary to the normal seasonal pattern, but increased seasonally in all other parts of the region. Monthly mean flows remained in the above-normal range in parts of Texas, and remained in the below-normal range in parts of Arkansas, Kansas, Louisiana, Nebraska, North Dakota, and Texas. Below-normal flows have

persisted in parts of North Dakota for 10 months and in parts of Kansas for 8 months, illustrating the continued lack of precipitation in those areas. Water-conservation measures were in use in at least 12 cities in Kansas, and also in Little Rock, Arkansas, at monthend.

Ground-water levels declined slightly in North Dakota and Texas; levels in both States were mostly below average. Levels rose in most of Nebraska but were near average or below average. Trends were mixed in Kansas and Arkansas but were below average. Levels rose and were above average in northern Iowa, but continued below average elsewhere in the State. New February low levels were reached in Kansas, Arkansas, Louisiana, and Texas.



Monthly mean discharge of Calcasieu River near Oberlin, La. (Drainage area, 753 sq mi; 1,950 sq km)

STREAMFLOW CONDITIONS

In Texas, streamflow generally decreased, contrary to the normal seasonal pattern, but was variable throughout the State. For example, in western Texas, monthly mean flow of North Concho River near Carlsbad decreased but remained in the above-normal range for the 4th consecutive month, and was 340 percent of median. Flows also were reported to have been above the normal range in the upper part of Guadalupe River basin. By contrast, in eastern parts of the State, monthly mean discharge of Neches River near Rockland also decreased, but remained in the below-normal range for the 4th consecutive month, and mean flow of North Bosque River near Clifton remained below the normal range for the 2d consecutive month. In northern and southern basins of the State, mean flows also were reported to have been below the normal range. Month-end records for 38 reservoirs showed that storage decreased in 22, increased in 11, and remained the same in 5.

In northwestern Louisiana, the monthly mean discharge of 48.2 cfs in Saline Bayou near Lucky (drainage area, 154 square miles) was only 17 percent of median, was 2d lowest for February since records began in June 1940, and remained below the normal range for the 3d consecutive month. In the southwestern part of the State, mean flow of Calcasieu River near Oberlin increased seasonally, was 35 percent of median, and remained in the below-normal range for the 3d consecutive month. (See graph.) In western Louisiana, mean flow of Bayou Toro near Toro was lowest of record for February, and in the central part of the State, mean flow of Mississippi River at Baton Rouge was 51 percent of median and was below the normal range.

In southern Arkansas, monthly mean flow of Saline River near Rye increased seasonally, but was only one-half of the median discharge for February, and remained below the normal range. In the northern part of the State, mean flow of Buffalo River near St. Joe also increased seasonally, but remained in the below-normal range for the 4th consecutive month and for the 7th time in the past 8 months.

In southern Missouri, the mean flow of 683 cfs in Gasconade River at Jerome (drainage area, 2,840 square miles) was the 6th lowest for February in 59 years of record, and remained in the below-normal range where it has been in 8 of the past 10 months. Cumulative runoff at this station for the first 5 months of the 1981 water year was only 41 percent of median. In the northwestern part of the State, the monthly mean flow of 33 cfs in Grand River near Gallatin (drainage area, 2,250 square miles) was the 7th lowest for the month in 58 years of record, was only 5 percent of median, and was below the normal range.

In southwestern Kansas, monthly mean discharge of Arkansas River at Arkansas City increased seasonally but remained below the normal range for the 6th consecutive month. Cumulative runoff at this station since October 1, 1980 was only 28 percent of the median cumulative runoff for that 5-month period. In the northeastern part of the State, mean flow of Little Blue River near Barnes increased seasonally, remained in the below-normal range for the 8th consecutive month, and was only 39 percent of median. Similarly, in northwestern Kansas, monthly mean discharge of Saline River near Russell increased seasonally, was 36 percent of the February median, and remained below the normal range for the 5th consecutive month.

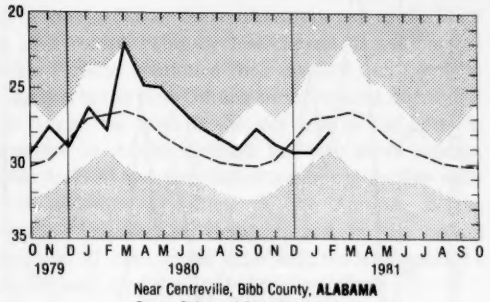
In southwestern Oklahoma, mean flow of Washita River near Durwood increased seasonally but was only

(Continued on page 12.)

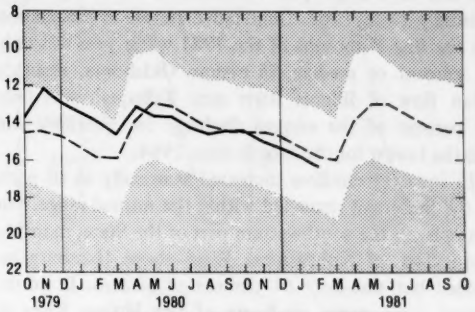
MONTH-END GROUND-WATER LEVELS IN KEY WELLS

UNSHADED AREA INDICATES RANGE BETWEEN HIGHEST AND LOWEST RECORD FOR THE MONTH
DOTTED LINE INDICATES AVERAGE OF MONTHLY LEVELS, IN PREVIOUS YEARS
HEAVY LINE INDICATES LEVEL FOR CURRENT PERIOD

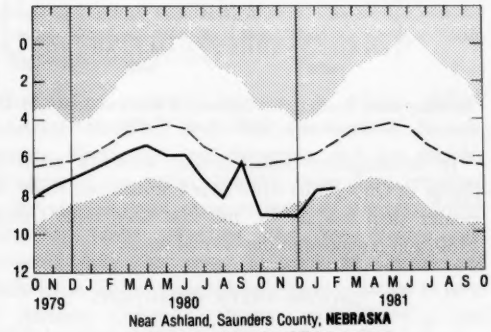
WATER LEVEL—FEET BELOW LAND-SURFACE DATUM



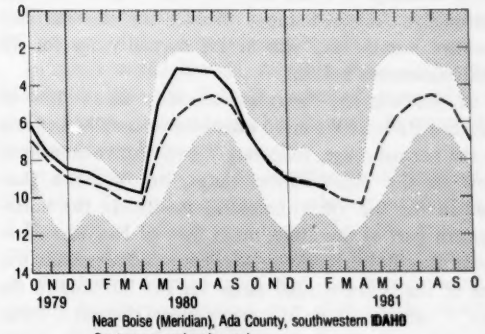
Near Centreville, Bibb County, **ALABAMA**
Copper Ridge and Chepultepec Dolomite
29 years of record, 1952—80



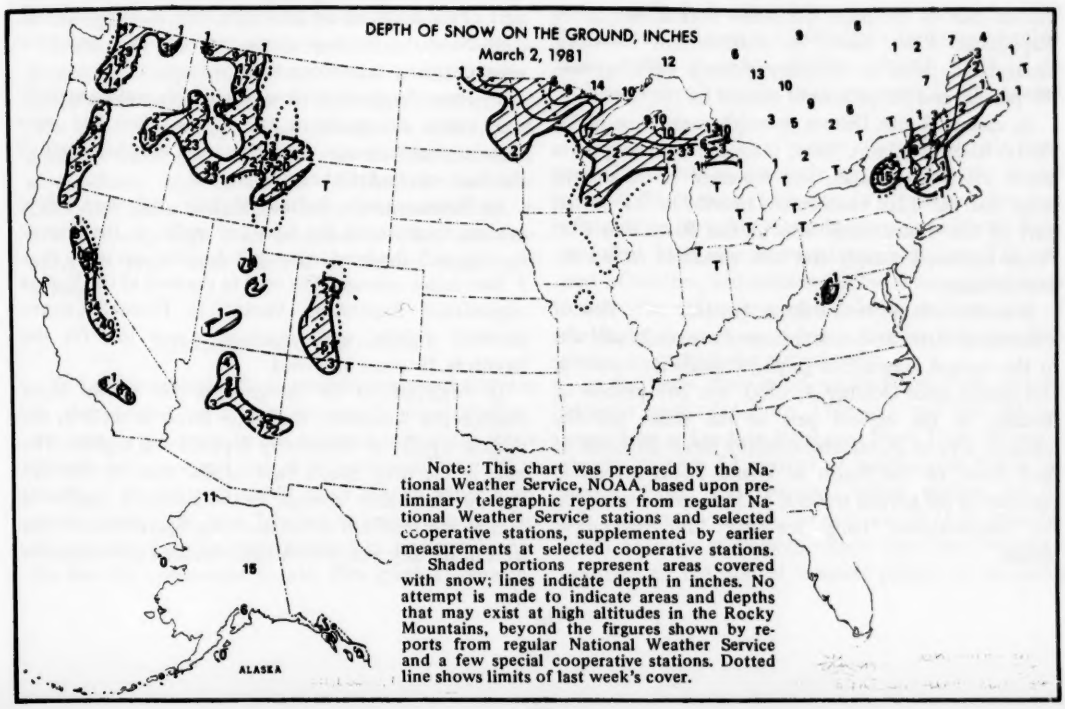
Near Ishpeming, Marquette County, **MICHIGAN**
Sand and gravel of Pleistocene age
20 years of record, 1961—80



Near Ashland, Saunders County, **NEBRASKA**
Sand and gravel deposits of Pleistocene age
48 years of record, 1933—80



Near Boise (Meridian), Ada County, southwestern **IDAHO**
Quaternary sand and gravel
47 years of record, 1934—80



Note: This chart was prepared by the National Weather Service, NOAA, based upon preliminary telegraphic reports from regular National Weather Service stations and selected cooperative stations, supplemented by earlier measurements at selected cooperative stations.

Shaded portions represent areas covered with snow; lines indicate depth in inches. No attempt is made to indicate areas and depths that may exist at high altitudes in the Rocky Mountains, beyond the figures shown by reports from regular National Weather Service and a few special cooperative stations. Dotted line shows limits of last week's cover.

(Continued from page 10.)

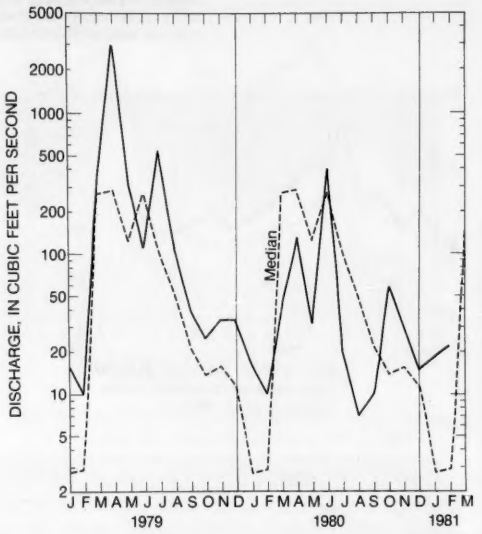
37 percent of median, was below the normal range for the 6th time in the past 7 months, and was lowest for February since 1967. Cumulative runoff at this station for the first 5 months of the 1981 water year was only 31 percent of median. In eastern Oklahoma, monthly mean flow of Illinois River near Tallequah was only 13 percent of the average discharge for February and was the lowest for the month since 1964.

In Iowa, streamflow increased seasonally in all parts of the State and remained within the normal range. For example, in the southwestern part of the State, monthly mean flow of Nishnabotna River above Hamburg increased but was only 64 percent of median. In north-central Iowa, mean discharge of Des Moines River at Fort Dodge also increased and was 121 percent of median but was in the normal range. In eastern Iowa, mean discharge of Cedar River at Cedar Rapids increased seasonally, remained above median for the 9th consecutive month, and was in the normal range for the 4th consecutive month.

In northeastern Nebraska, monthly mean flow of Elkhorn River at Waterloo increased seasonally and was in the normal range, following 7 consecutive months of flow in the below-normal range, but was less than median for the 9th consecutive month. In the northwestern part of the State, mean flow of Niobrara River above Box Butte Reservoir also increased seasonally but was in the below-normal range for the 2d time in the past 3 months. Also in northwestern Nebraska, mean flow of North Platte River at Lisco decreased and was only 65 percent of median. Streamflow in the north-central part of the State was below normal, and in the Republican River basin, in southwestern Nebraska, unregulated flows in tributary streams were between 40 percent and 50 percent of normal for the month.

In eastern South Dakota, monthly mean flow of Big Sioux River at Akron, Iowa, increased seasonally, was about 1½ times median, and remained in the normal range for the 12th consecutive month. In the central part of the State, mean flow of Bad River near Fort Pierre increased sharply but also remained within the normal range.

In southwestern North Dakota, monthly mean flow of Cannonball River at Breien increased seasonally and was in the normal range. (See graph.) Cumulative runoff at this station since October 1, 1980, was 267 percent of median. In the eastern part of the State, and the adjacent area of Minnesota, monthly mean discharge of Red River of the North at Grand Forks increased, contrary to the normal seasonal pattern, and remained in the below-normal range for the 10th consecutive month.



Monthly mean discharge of Cannonball River at Breien, N. Dak. (Drainage area, 4,100 sq mi; 10,600 sq km)

In southeastern Saskatchewan, monthly mean discharge of Qu'Appelle River near Lumsden increased, was greater than median for the first time since October 1980, and remained in the normal range.

GROUND-WATER CONDITIONS

In North Dakota, ground-water levels declined slightly and continued below normal except in the north-central part of the State, where they were near or above normal.

In Nebraska, levels generally rose statewide and were near or slightly below long-term averages.

In Iowa, levels in shallow water-table wells generally rose across the northern half of the State and were slightly above average. Levels in wells in other parts of the State were a little below average.

In Kansas, levels declined slightly and were below average in three of the four key wells; in the Harvey County well the level rose 1-2/3 feet but was more than 5 feet below average. The level in the well at the Kansas Agricultural Experiment Station in Thomas County declined slightly, again reaching a new low for the month in 33 years of record.

In Arkansas, in the rice-growing part of the State (east-central Arkansas), the water levels in wells in the shallow aquifer in Quaternary deposits rose slightly. The level in the deep Sparta Sand aquifer rose 4½ feet but was 30 feet below average. In the industrial aquifer of central and southern Arkansas——the Sparta Sand——the level in the key well at Pine Bluff declined and was more

than 42 feet below average, reaching a new February low in 22 years of record.

In Louisiana, trends were mixed. The level in the key well in the rice belt in the southwestern part of the State was at a record February low. Levels in wells in the Florida Parishes continued their seasonal rise. Levels in all aquifers in the New Orleans area recovered slightly.

In Texas, the level in the key well in the Edwards Limestone at Austin declined but was above average. Levels declined and were below average in the key wells in the Edwards Limestone at San Antonio, in the Evangeline aquifer at Houston, and in the bolson deposits at El Paso. In the latter well, the level reached a new low level for February in 16 years of record.

WEST

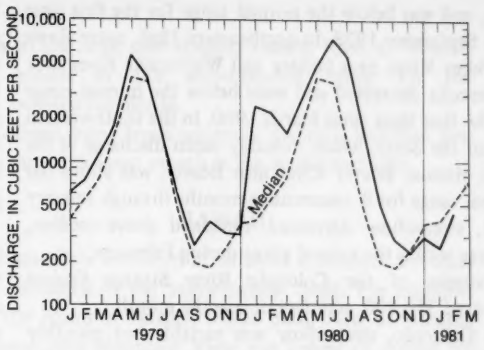
[Alberta and British Columbia; Arizona, California, Colorado, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, Washington, and Wyoming]

Streamflow generally decreased in Alberta, British Columbia, Montana, and Utah, increased in Nevada, Oregon, Washington, and Wyoming, and was variable elsewhere in the region. Monthly mean flows remained in the above-normal range in parts of Alberta, British Columbia, Idaho, Montana, and New Mexico, and increased into that range in parts of Oregon and Washington. Below-normal streamflow persisted in parts of Arizona, Colorado, Oregon, and Wyoming, and decreased into that range in parts of Idaho, New Mexico, and Utah. Monthend snowpack generally remained only at the higher elevations and was far below normal.

Ground-water levels rose in New Mexico, and mostly declined in Idaho; trends were mixed in other States. Levels were below average in Arizona, Montana, and New Mexico, mostly below average in Idaho, and generally above and below average in other States. A new alltime high level was reached in southern California, and a new alltime low was noted in Idaho. A new February high level occurred in Utah, and new February lows were reached in Idaho, Utah, and Arizona.

STREAMFLOW CONDITIONS

In California, streamflow generally increased and was in the normal range but remained below median throughout the State. In the southern part of the Sierra Nevada west slope and typical of the streamflow trend in much of the State, monthly mean flow of Kings River above North Fork, near Trimmer increased seasonally to 82 percent of median and remained in the normal range for the 4th consecutive month. (See graph.) Combined



Monthly mean discharge of Kings River above North Fork, near Trimmer, Calif. (Drainage area, 952 sq mi; 2,466 sq km)

contents of 10 reservoirs in northern and central California at monthend were 116 percent of average and 96 percent of the contents one year ago.

In north-central Nevada, monthly mean discharge of Humboldt River at Palisade increased seasonally, remained in the normal range, but was only 81 percent of median during February.

In southern Arizona, the monthly mean discharge of 9.2 cfs in San Pedro River at Charleston (drainage area, 1,219 square miles) was lowest for the month in 70 years of record, and mean flow at that site remained in the below-normal range for the 8th consecutive month. In the northeastern part of the State, monthly mean flow in Little Colorado River near Cameron increased seasonally but was only 2 percent of median and remained in the below-normal range for the 5th consecutive month. Elsewhere in the State, monthly mean flows at index stations ranged from 58 to 112 percent of median and remained in the normal range.

In southwestern New Mexico, flow of the Gila River near Gila decreased seasonally and was below the normal range at 79 percent of median. In the southeastern part of the State, monthly mean discharge in Delaware River near Red Bluff also decreased seasonally, was 222 percent of median, and remained in the above-normal range for the 4th consecutive month. In the northern part of the State, mean flows at index stations were less than median but within the normal range.

In San Juan River basin, southeastern Utah, and the adjacent areas of Arizona, Colorado, and New Mexico, mean flow in San Juan River near Bluff, Utah, decreased sharply to only 54 percent of median, was below the normal range, and remained below median for the 5th consecutive month. In east-central Utah, monthly mean discharge of Colorado River near Cisco decreased, contrary to the normal seasonal pattern of increasing

flow, and was below the normal range for the first time since September 1978. In northeastern Utah, mean flows of Weber River near Oakley and Whiterocks River near Whiterocks decreased and were below the normal range for the first time since March 1980. In the southwestern part of the State, where monthly mean discharge at the index station, Beaver River near Beaver, was above the normal range for 8 consecutive months through January 1981, streamflow decreased, remained above median, but was within the normal range during February.

Contents of the Colorado River Storage Project decreased 350,900 acre-feet during the month.

In Colorado, streamflow was variable but monthly mean discharges at all index stations were in the below-normal range. In the northwestern part of the State, monthly mean discharge of Yampa River at Steamboat Springs increased seasonally to 72 percent of the median flow for February but remained in the below-normal range for the 4th consecutive month. Snowpack at end of February was reported as record low in some places in the State.

In northern Wyoming, monthly mean discharge of Tongue River near Dayton increased, contrary to the normal seasonal pattern, but remained in the below-normal range for 3 out of the past 4 months. In the southern part of the State, flows remained in the normal range for the 9th consecutive month at North Platte River above Seminoe Reservoir, near Sinclair. Snowpack, as reported by the U.S. Soil Conservation Service, remained well below average in Wyoming.

In southeastern Idaho, monthly mean flow of Snake River near Heise decreased seasonally and was below the normal range for the first time since March 1980. In the northern part of the State, monthly mean flows of Salmon River at White Bird and Clearwater River at Spalding were 121 percent and 177 percent of median, respectively, and remained in the above-normal range for the 3d consecutive month. Reservoir storage for irrigation was above average.

In northwestern Montana, streamflow decreased at Clark Fork at St. Regis, Middle Fork Flathead River near West Glacier, and Marias River near Shelby, was 130, 185, and 201 percent of their respective median flows, and remained in the above-normal range. In the southern part of the State, mean flows at index stations on the Yellowstone River also decreased but were within the normal range.

In Alberta and British Columbia, monthly mean discharges at index stations decreased seasonally but remained in the above-normal range.

In northwestern Washington, where monthly mean discharge in Skykomish River near Gold Bar was below the normal range and only 61 percent of median in January, mean flow increased, contrary to the normal seasonal pattern of decreasing flows, was above the normal range, and was almost twice the median flow for February. In the eastern part of the State, monthly mean flow of Spokane River at Spokane increased seasonally to almost twice the median and was above the normal range. Elsewhere in the State, mean flows generally increased and were in the normal range.

In north-coastal Oregon, where mean flow in January in Wilson River near Tillamook was below the normal range and only 33 percent of median, streamflow increased sharply to 137 percent of median in February and was above the normal range for the first time since September 1978. By contrast, monthly mean discharge of Umpqua River near Elkton, along the southern Oregon Coast, increased but remained in the below-normal range for the 2d consecutive month.

GROUND-WATER CONDITIONS

In Washington, the artesian ground-water level in the key well in Tacoma, in the western part of the State, declined slightly but continued above average by more than 3 feet. The level in the key water-table well in Spokane Valley, in eastern Washington, rose nearly a foot but continued slightly below average.

In Idaho, the level in the well penetrating the sand and gravel aquifer in the Boise Valley was slightly above average. In the key wells representative of the Snake River Plain aquifer, levels reached new month-end lows near Atomic City and Rupert, the level was at a new record low in the well near Eden, and was below average in the well near Gooding. The level in the water-table well representative of the alluvial aquifer underlying the Rathdrum Prairie, in northern Idaho, rose a little more than ½ foot but continued below average by more than 7 feet.

In the key water-table wells in Montana, the level at Missoula declined nearly a foot and the level at Hamilton Fairgrounds rose slightly; both were about a foot below average.

In southern California, in Santa Barbara County, the levels in the key wells at Lompoc and Santa Maria rose, while the level in the well in Upper Cuyama Valley declined. The month-end levels at all three wells were above average. The level in the well at Baldwin Park, in Los Angeles County, continued to decline and remained below average. The level in the non-artesian observation well in the Santa Maria Valley reached a new alltime high level in 23 years of record.

In Nevada, the levels in the key wells in Las Vegas and Paradise Valleys rose; the level was below average in Las Vegas Valley and above average in Paradise Valley. At Truckee Meadows, the level in the key well declined and was below average.

In Utah, levels rose but were below average in wells in the Flowell and Holladay areas. On the other hand, levels declined but were above average in the Logan and Blanding areas. The level in the well in the Holladay area, despite a slight net rise, was nevertheless at a new low for February in 32 years of record. The level in the well in the Blanding area, despite its slight net decline during the month, was at a new high level in 20 years of record.

In Arizona, levels rose in two index wells and declined in three. The level in the well in the Elfrida area declined slightly and reached a new low level for February in 30 years of record. In addition, new February lows were recorded in two other observation wells in the State.

In New Mexico, the level in the Hrna observation well rose more than 2½ feet but was more than 6½ feet below average. Levels in the three other principal observation wells rose slightly but continued below average.

ALASKA

Streamflow decreased seasonally at all index stations in the State and was above the normal range except for parts of Alaska's interior and south-central areas. In the south-coastal basin of Kenai River, the monthly mean discharge of 2,104 cfs and the daily mean flow of 3,360 cfs on the 1st at Cooper Landing (drainage area, 634 square miles) were highest for February in 34 years of record. In southeastern Alaska, mean flow of Gold Creek at Juneau decreased to 293 percent of median and remained in the above-normal range as a result of high carryover flow from the record high flows that occurred at that site during January. Above-normal wintertime temperatures and high carryover flow caused flow at the large river station, Tanana River at Nenana, to remain in the above-normal range for the 4th consecutive month.

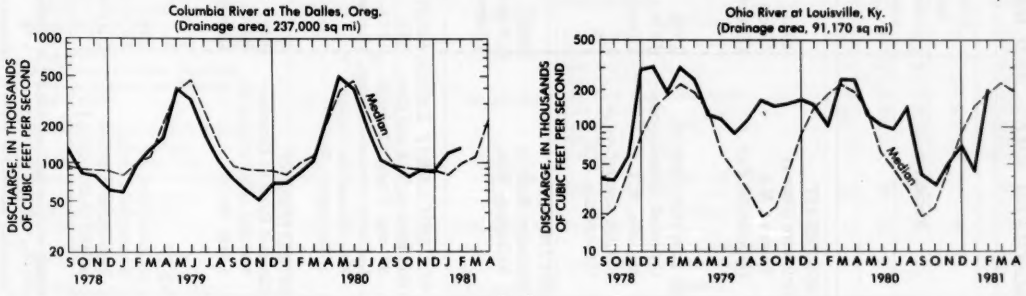
Ground-water levels generally declined less than two feet during the past month in the Anchorage area.

HAWAII

Streamflow increased at all index stations in the State but remained in the below-normal range. For example, on the island of Hawaii, where mean flow of Waiakea Stream near Mountain View was lowest of record for January, monthly mean discharge increased seasonally but was only 3 percent of the February median and remained in the below-normal range for the 3d consecutive month. Similarly, on the island of Maui, mean discharge of Honopou Stream near Huelo increased but was below the normal range for the 3d consecutive month. On the island of Kauai, monthly mean discharge of East Branch of North Fork Wailua River near Lihue increased, contrary to the normal seasonal pattern, and was below the normal range for the 2d consecutive month. Mean discharge for January was lowest of record for that month at this station. The drought that began nearly 5 months ago on the island of Hawaii was declared ended on February 23 in the Hilo and Puna areas and in parts of the Hamakua coast. The National Weather Service at Hilo Airport reported 3.93 inches of rainfall during the previous 3 days and as a result, water restrictions in those areas were rescinded. Drought conditions still persist in the South Kohala area of the island and water restrictions are still in effect.

On Guam, Mariana Islands, monthly mean flow of Ylig River near Yona decreased seasonally but remained in the normal range for the 5th consecutive month.

HYDROGRAPHS OF TWO LARGE RIVERS



DISSOLVED SOLIDS AND WATER TEMPERATURES FOR FEBRUARY AT DOWNSTREAM SITES ON SIX LARGE RIVERS

Station number	Station name	February data of following calendar years	Stream discharge during month	Dissolved-solids concentration during month[a]		Dissolved-solids discharge during month[a]			Water temperature during month[b]		
			Mean (cfs)	Minimum (mg/L)	Maximum (mg/L)	Mean	Minimum	Maximum	Mean, in °C	Minimum, in °C	Maximum, in °C
						(tons per day)					
	NORTHEAST										
01463500	Delaware River at	1981	22,340	67	139	4,780	772	11,000	3.0	0	6.5
	Trenton, N.J.	1945–80	13,310	61	144	.....	647	9,580	.....	0	8.5
	(Morrisville, Pa.)	(Extreme yr)		(1954)	(1977)		(1976)	(1976)			
			[c]10,620								
04264331	St. Lawrence River at	1981	240,000	165	167	107,000	91,000	110,000	1.0	0.5	1.0
	Cornwall, Ontario, near	1976–80	252,700	166	168	114,000	90,000	134,000	0.5	0.5	0.5
	Massena, N.Y.	(Extreme yr)		(1980)	(1976, 78–79)		(1977)	(1978)			
	median streamflow at Ogdensburg, N.Y.		[c]226,000								
	SOUTHEAST										
07289000	Mississippi River at	1981	341,900	228	286	226,000	138,000	287,000	5.0	3.0	6.5
	Vicksburg, Miss.	1976–80	538,500	160	242	291,000	108,000	460,000	4.5	0	10.5
		(Extreme yr)		(1979)	(1977)		(1977)	(1978)			
			[c]652,600								
	WESTERN GREAT LAKES REGION										
03612500	Ohio River at lock and dam	1981	291,000	172	267	.....	64,700	260,000	.....	1.5	6.0
	53, near Grand Chain, Ill.	1955–80	436,300	98	308	.....	44,900	419,000	.....	0	10.0
	(25 miles west of Paducah, Ky.; streamflow station at Metropolis, Ill.)	(Extreme yr)		(1957)	(1967)		(1955)	(1974)			
			[c]407,600								
	MIDCONTINENT										
06934500	Missouri River at Hermann	1981	29,900	401	530	37,600	26,300	61,700	4.5	0	12.0
	Mo. (60 miles west of St.	1976–80	46,000	208	448	53,300	23,500	105,000	2.0	0	9.0
	Louis, Mo.)	(Extreme yr)		(1979)	(1977)		(1977)	(1979)			
			[c]45,700								
	WEST										
14128910	Columbia River at	1981	197,000	91	100	52,100	36,600	63,400	4.5	4.0	5.0
	Warrendale, Oreg.	1976–80	164,000	87	128	45,700	24,800	78,400	3.5	0.5	7.0
	(streamflow station at The Dalles, Oreg.)	(Extreme yr)		(1976)	(1977)		(1977)	(1979)			
			[c]126,000								

[a]Dissolved-solids concentrations when not analyzed directly, are calculated on basis of measurements of specific conductance.
[b]To convert °C to °F: [(1.8 X °C) + 32] = °F.
[c]Median of monthly values for 30-year reference period, water years 1941–70, for comparison with data for current month.

USABLE CONTENTS OF SELECTED RESERVOIRS NEAR END OF FEBRUARY 1981

[Contents are expressed in percent of reservoir capacity. The usable storage capacity of each reservoir is shown in the column headed "Normal maximum."]

Reservoir Principal uses: F–Flood control I–Irrigation M–Municipal P–Power R–Recreation W–Industrial	End of Jan. 1981	End of Feb. 1981	End of Feb. 1980	Average for end of Feb.	Normal maximum
	Percent of normal maximum				
NORTHEAST REGION					
NOVA SCOTIA					
Rossignol, Mulgrave, Falls Lake, St. Margaret's Bay, Black, and Ponhook Reservoirs (P)	65	73	54	58	226,300 (a)
QUEBEC					
Allard (P)	63	68	44	28	280,600 ac-ft
Gouin (P)	73	65	69	47	6,954,000 ac-ft
MAINE					
Seven reservoir systems (MP)	45	56	30	40	178,500 mcf
NEW HAMPSHIRE					
First Connecticut Lake (P)	41	40	44	18	3,330 mcf
Lake Francis (FPR)	53	71	47	29	4,326 mcf
Lake Winnipesaukee (PR)	53	86	62	50	7,220 mcf
VERMONT					
Harriman (P)	49	80	42	31	5,060 mcf
Somerset (P)	58	79	45	50	2,500 mcf
MASSACHUSETTS					
Cobble Mountain and Borden Brook (MP)	59	82	69	69	3,394 mcf
NEW YORK					
Great Sacandaga Lake (FPR)	39	78	27	35	34,270 mcf
Indian Lake (FMP)	54	81	52	40	4,500 mcf
New York City reservoir system (MW)	28	61	78	.....	547,500 mg
NEW JERSEY					
Wanaque (M)	16	47	90	81	27,730 mg
PENNSYLVANIA					
Allegheny (FPR)	19	25	29	23	51,400 mcf
Pymatuning (FMR)	80	86	86	86	8,191 mcf
Raystown Lake (FR)	52	51	48	49	33,190 mcf
Lake Wallenpaupack (PR)	39	51	50	50	6,875 mcf
MARYLAND					
Baltimore municipal system (M)	71	78	98	90	85,340 mg
SOUTHEAST REGION					
NORTH CAROLINA					
Bridgewater (Lake James) (P)	79	86	75	83	12,580 mcf
Narrows (Badin Lake) (P)	74	93	87	101	5,616 mcf
High Rock Lake (P)	23	38	41	76	10,230 mcf
SOUTH CAROLINA					
Lake Murray (P)	74	84	81	69	70,300 mcf
Lakes Marion and Moultrie (P)	62	77	72	75	81,100 mcf
SOUTH CAROLINA--GEORGIA					
Clark Hill (FP)	51	69	70	66	75,360 mcf
GEORGIA					
Burton (PR)	55	72	63	68	104,000 ac-ft
Sinclair (MPR)	88	97	88	85	214,000 ac-ft
Lake Sidney Lanier (FMPR)	46	51	63	58	1,686,000 ac-ft
ALABAMA					
Lake Martin (P)	64	74	75	76	1,373,000 ac-ft
TENNESSEE VALLEY					
Clinch Projects: Norris and Melton Hill Lakes (FPR)	14	23	40	39	1,156,000 cfsd
Douglas Lake (FPR)	8	25	20	22	703,100 cfsd
Hiwassee Projects: Chatuge, Nottely, Hiwassee, Apalachia, Blue Ridge, Ocoee 3, and Parksville Lakes (FPR)	38	41	48	49	510,300 cfsd
Holston Projects: South Holston, Watauga, Boone, Fort Patrick Henry, and Cherokee Lakes (FPR)	28	35	49	41	1,452,000 cfsd
Little Tennessee Projects: Nantahala, Thorpe, Fontana, and Chilhowee Lakes (FPR)	23	34	46	48	745,200 cfsd
WESTERN GREAT LAKES REGION					
WISCONSIN					
Chippewa and Flambeau (PR)	51	48	41	25	15,900 mcf
Wisconsin River (21 reservoirs) (PR)	49	35	26	16	17,400 mcf
MINNESOTA					
Mississippi River headwater system (FMR)	18	20	18	18	1,640,000 ac-ft
MIDCONTINENT REGION					
NORTH DAKOTA					
Lake Sakakawea (Garrison) (FIPR)	74	71	82	81	22,700,000 ac-ft
SOUTH DAKOTA					
Angostura (I)	71	73	99	76	127,600 ac-ft
Bell Fourche (I)	36	41	52	53	185,200 ac-ft
Lake Francis Case (FIP)	63	63	73	73	4,834,000 ac-ft
Lake Oahe (FIP)	74	76	84	.....	22,530,000 ac-ft
MIDCONTINENT REGION--Continued					
SOUTH DAKOTA--Continued					
Lake Sharpe (FIP)	100	101	101	96	1,725,000 ac-ft
Lewis and Clarke Lake (FIP)	97	82	79	83	477,000 ac-ft
NEBRASKA					
Lake McConaughy (IP)	79	80	82	74	1,948,000 ac-ft
OKLAHOMA					
Eufaula (FPR)	75	75	81	82	2,378,000 ac-ft
Keystone (FPR)	83	84	85	89	661,000 ac-ft
Tenkiller Ferry (FPR)	85	86	90	90	628,200 ac-ft
Lake Altus (FIMR)	20	20	68	54	133,000 ac-ft
Lake O'The Cherokees (FPR)	75	76	77	79	1,492,000 ac-ft
OKLAHOMA--TEXAS					
Lake Texoma (FMPRW)	87	84	88	87	2,722,000 ac-ft
TEXAS					
Bridgeport (IMW)	28	28	41	44	386,400 ac-ft
Canyon (FMR)	93	93	94	74	385,600 ac-ft
International Amistad (FIMPW)	89	89	94	83	3,497,000 ac-ft
International Falcon (FIMPW)	85	88	89	75	2,668,000 ac-ft
Livingston (IMW)	89	91	99	82	1,788,000 ac-ft
Possum Kingdom (IMPRW)	89	87	86	96	570,200 ac-ft
Red Bluff (PI)	24	25	27	31	307,000 ac-ft
Toledo Bend (P)	81	82	96	84	4,472,000 ac-ft
Twin Buttes (FIM)	43	44	42	31	177,800 ac-ft
Lake Kemp (IMW)	44	44	54	86	268,000 ac-ft
Lake Meredith (FMW)	19	18	27	36	821,300 ac-ft
Lake Travis (FIMPRW)	99	99	88	80	1,144,000 ac-ft
THE WEST					
WASHINGTON					
Ross (PR)	86	86	18	40	1,052,000 ac-ft
Franklin D. Roosevelt Lake (IP)	94	98	44	66	5,022,000 ac-ft
Lake Chelan (PR)	70	65	26	36	676,100 ac-ft
Lake Cushman	81	90	89	85	359,500 ac-ft
Lake Merwin (P)	103	97	94	96	245,600 ac-ft
IDAHO					
Boise River (4 reservoirs) (FIP)	74	81	57	64	1,235,000 ac-ft
Coeur d'Alene Lake (P)	81	103	34	50	238,500 ac-ft
Pend Oreille Lake (FP)	83	84	36	51	1,561,000 ac-ft
IDAHO--WYOMING					
Upper Snake River (8 reservoirs) (MP)	66	84	76	71	4,401,000 ac-ft
WYOMING					
Boysen (FIP)	76	74	70	66	802,000 ac-ft
Buffalo Bill (IP)	76	77	51	62	421,300 ac-ft
Keyhole (F)	51	51	75	46	190,400 ac-ft
Pathfinder, Seminoe, Alcova, Kortes, Glendo, and Guernsey Reservoirs (I)	61	62	60	48	3,056,000 ac-ft
COLORADO					
John Martin (FIR)	17	19	9	16	364,400 ac-ft
Taylor Park (IR)	52	49	67	55	106,200 ac-ft
Colorado–Big Thompson project (I)	70	70	66	55	722,600 ac-ft
COLORADO RIVER STORAGE PROJECT					
Lake Powell; Flaming Gorge, Fontenelle, Navajo, and Blue Mesa Reservoirs (IFPR)	85	84	79	.....	31,620,000 ac-ft
UTAH--IDAHO					
Bear Lake (IPR)	74	74	71	57	1,421,000 ac-ft
CALIFORNIA					
Folsom (FIP)	62	70	68	58	1,000,000 ac-ft
Hetch Hetchy (MP)	33	31	58	28	360,400 ac-ft
Isabella (FIR)	40	42	66	27	568,100 ac-ft
Pine Flat (FI)	73	77	90	55	1,001,000 ac-ft
Clair Engle Lake (Lewiston) (P)	78	84	88	79	2,438,000 ac-ft
Lake Almanor (P)	83	84	74	49	1,036,000 ac-ft
Lake Berryessa (FIMW)	82	87	90	86	1,600,000 ac-ft
Millerton Lake (FI)	55	59	87	66	503,200 ac-ft
Shasta Lake (FIPR)	76	87	90	74	4,377,000 ac-ft
CALIFORNIA--NEVADA					
Lake Tahoe (IPR)	44	48	34	52	744,600 ac-ft
NEVADA					
Rye Patch (I)	82	85	63	59	194,300 ac-ft
ARIZONA--NEVADA					
Lake Mead and Lake Mohave (FIMP)	90	91	88	66	27,970,000 ac-ft
ARIZONA					
San Carlos (IP)	62	61	100	20	1,073,000 ac-ft
Salt and Verde River system (IMPR)	71	55	80	44	2,073,000 ac-ft
NEW MEXICO					
Conchas (FIR)	35	35	46	83	330,100 ac-ft
Elephant Butte and Caballo (FIPR)	55	55	44	30	2,453,000 ac-ft

[a] Thousands of kilowatt-hours (the potential electric power that could be generated by the volume of water in storage).

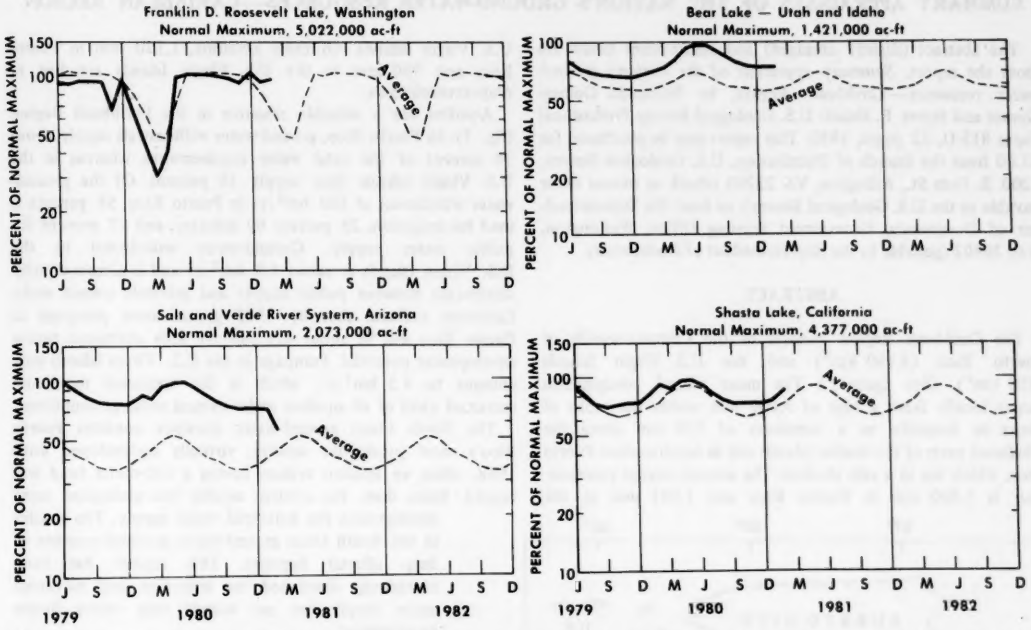
Provisional data; subject to revision

FLOW OF LARGE RIVERS DURING FEBRUARY 1981

Station number*	Stream and place of determination	Drainage area (square miles)	Mean annual discharge through September 1975 (cfs)	February 1981					
				Monthly discharge (cfs)	Percent of median monthly discharge, 1941–70	Charge in discharge from previous month (percent)	Discharge near end of month		
							(cfs)	(mgd)	Date
1–0140	St. John River below Fish River at Fort Kent, Maine	5,690	9,549	6,005	312	+212	22,300	14,400	28
1–3185	Hudson River at Hadley, N.Y	1,664	2,853	7,123	410	+632	.....	.....	...
1–3575	Mohawk River at Cohoes, N.Y	3,456	5,630	13,850	287	+631	.....	.....	...
1–4635	Delaware River at Trenton, N.J	6,780	11,630	22,440	211	+820	35,800	23,100	26
1–5705	Susquehanna River at Harrisburg, Pa	24,100	34,200	85,500	233	+1,251	278,000	180,000	24
1–6465	Potomac River near Washington, D.C	11,560	[1]11,190	13,410	96	+493	43,000	27,800	24
2–1055	Cape Fear River at William O. Huske Lock near Tarheel, N.C	4,810	5,007	5,460	62	+187	3,100	2,000	28
2–1310	Pee Dee River at Peedee, S.C	8,830	9,657	8,050	60	+117	12,600	8,140	23
2–2260	Altamaha River at Doctortown, Ga	13,600	13,780	13,250	70	+272	38,000	24,600	25
2–3205	Suwannee River at Branford, Fla	7,880	6,970	4,250	55	+54	5,750	3,720	28
2–3580	Apalachicola River at Chattahoochee, Fla	17,200	22,330	28,000	94	+235	43,800	28,300	28
2–4670	Tombigbee River at Demopolis lock and dam near Coatopa, Ala	15,400	22,570	25,710	55	+323	15,800	10,200	26
2–4895	Pearl River near Bogalusa, La	6,630	9,263	8,747	58	+180	4,990	3,230	28
3–0495	Allegheny River at Natrona, Pa	11,410	[1]19,210	44,811	161	+382	82,400	53,300	24
3–0850	Monongahela River at Braddock, Pa	7,337	[1]12,360	39,540	221	+845	59,300	38,300	24
3–1930	Kanawha River at Kanawha Falls, W.Va	8,367	12,530	16,960	86	+376	37,100	24,000	24
3–2345	Scioto River at Higby, Ohio	5,131	4,513	8,660	112	+554	8,610	5,560	27
3–2945	Ohio River at Louisville, Ky[2]	91,170	114,100	205,500	112	+355	329,400	212,900	23
3–3775	Wabash River at Mount Carmel, Ill	28,635	27,030	20,150	61	+277	33,000	21,300	28
3–4690	French Broad River below Douglas Dam, Tenn	4,543	[1]6,794	7,900	75	+246	.....	.....	...
4–0845	Fox River at Rapide Croche Dam, near Wrightstown, Wis[2]	6,150	4,185	4,020	111	+24	.....	.....	...
02MC002 (4–2643.31)	St. Lawrence River at Cornwall, Ontario–near Massena, N.Y[3]	299,000	241,100	239,500	106	+1	225,000	145,000	28
050115	St. Maurice River at Grand Mere, Quebec	16,300	25,300	14,500	189	+270	49,200	31,800	27
5–0825	Red River of the North at Grand Forks, N. Dak	30,100	2,524	399	54	+37	980	630	28
5–1335	Rainy River at Manitou Rapids, Minn	19,400	12,950	9,650	104	+7	9,300	6,010	20
5–3300	Minnesota River near Jordan, Minn	16,200	3,412	532	100	+20	920	590	25
5–3310	Mississippi River at St. Paul, Minn	36,800	[1]10,580	3,270	77	-3	4,450	2,880	25
5–3655	Chippewa River at Chippewa Falls, Wis	5,600	5,110	2,730	93	+11	.....	.....	...
5–4070	Wisconsin River at Muscoda, Wis	10,300	8,613	7,650	126	+22	14,500	9,370	28
5–4465	Rock River near Joslin, Ill	9,551	5,852	5,170	107	+42	13,000	8,400	28
5–4745	Mississippi River at Keokuk, Iowa	119,000	62,570	46,070	115	+51	95,600	61,800	28
6–2145	Yellowstone River at Billings, Mont	11,796	6,986	2,670	100	-5	2,800	1,810	28
6–9345	Missouri River at Hermann, Mo	524,200	79,750	29,900	65	+19	44,700	28,900	24
7–2890	Mississippi River at Vicksburg, Miss[4]	1,140,500	573,600	341,900	52	+94	379,000	245,000	23
7–3310	Washita River near Durwood, Okla	7,202	1,414	190	37	+2	185	120	28
7–2765	Rio Grande below Taos Junction Bridge, near Taos, N. Mex	9,730	724	435	83	+4	485	313	28
9–3150	Green River at Green River, Utah	40,600	6,366	1,997	85	+16	.....	.....	...
11–4255	Sacramento River at Verona, Calif	21,257	19,150	21,829	57	+33	15,200	9,820	26
13–2690	Snake River at Weiser, Idaho	69,200	18,170	16,712	92	+10	16,760	10,800	25
13–3170	Salmon River at White Bird, Idaho	13,550	11,290	5,480	121	-4	6,590	4,260	25
13–3425	Clearwater River at Spalding, Idaho	9,570	15,570	11,361	124	-10	15,430	9,970	26
14–1057	Columbia River at The Dalles, Oreg[5]	237,000	194,600	136,100	133	+11	.....	.....	...
14–1910	Willamette River at Salem, Oreg	7,280	23,810	37,990	83	+140	46,180	29,850	22–26
15–5155	Tanana River at Nenana, Alaska	25,600	23,850	6,650	107	-4	6,400	4,140	28
8MF005	Fraser River at Hope, British Columbia	83,800	96,400	50,490	169	-20	55,080	35,600	26

[1] Adjusted.
[2] Records furnished by Corps of Engineers.
[3] Records furnished by Buffalo District, Corps of Engineers, through International St. Lawrence River Board of Control. Discharges shown are considered to be the same as discharge at Ogdensburg, N.Y. when adjusted for storage in Lake St. Lawrence.
[4] Records of daily discharge computed jointly by Corps of Engineers and Geological Survey.
[5] Discharge determined from information furnished by Bureau of Reclamation, Corps of Engineers, and Geological Survey.
*The U.S. station numbers as listed in this table are in a shortened form previously in use, and used here for simplicity of tabular and map presentation. The full, correct number contains 8 digits and no punctuation marks. For example, the correct form for station number 1–3185 is 01318500.

USABLE CONTENTS OF SELECTED RESERVOIRS AND RESERVOIR SYSTEMS, JUNE 1979 TO FEBRUARY 1981



Above-average contents continued to characterize most reservoirs in the West during February, including all of the reservoirs and reservoir systems shown on the graphs above.

WATER RESOURCES REVIEW

February 1981

Based on reports from the Canadian and U.S. field offices; completed March 12, 1981

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EXPLANATION OF DATA

Cover map shows generalized pattern of streamflow for February based on 20 index stream-gaging stations in Canada and 130 index stations in the United States. Alaska and Hawaii inset maps show streamflow only at the index gaging stations which are located near the points shown by the arrows.

Streamflow for February 1981 is compared with flow for February in the 30-year reference period 1941–70. Streamflow is considered to be *below the normal range* if it is within the range of the low flows that have occurred 25 percent of the time (below the lower quartile) during the reference period. Flow for February is considered to be *above the normal range* if it is within the range of the high flows that have occurred 25 percent of the time (above the upper quartile).

Flow higher than the lower quartile but lower than the upper quartile is described as being *within the normal range.* In the Water Resources Review the median is obtained by ranking the 30 flows of the reference period in their order of magnitude; the highest flow is number 1, the lowest flow is number 30, and the average of the 15th and 16th highest flows is the median.

The normal is an average (but not an arithmetic average) or middle value; half of the time you would expect the February flows to be below the median and half of the time to be above the median. Shorter reference periods are used for the Alaska index stations because of the limited records available.

Statements about *ground-water levels* refer to conditions near the end of February. Water level in each key observation well is compared with average level for the end of February determined from the entire past record for that well or from a 20-year reference period, 1951–70. *Changes in ground-water levels,* unless described otherwise, are from the end of January to the end of February.

The Water Resources Review is published monthly. Special-purpose and summary issues are also published. Issues of the Review are free on application to the Water Resources Review, U.S. Geological Survey, Reston, Virginia 22092.

SUMMARY APPRAISALS OF THE NATION'S GROUND-WATER RESOURCES—CARIBBEAN REGION

The abstract (slightly abridged) and illustrations below are from the report, *Summary appraisals of the Nation's ground-water resources—Caribbean Region,* by Fernando Gomez-Gomez and James E. Heisel: U.S. Geological Survey Professional Paper 813-U, 32 pages, 1980. This report may be purchased for $3.00 from the Branch of Distribution, U.S. Geological Survey, 1200 S. Eads St., Arlington, VA 22202 (check or money order payable to the U.S. Geological Survey); or from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402 (payable to the Superintendent of Documents).

ABSTRACT

The Caribbean Region consists of the Commonwealth of Puerto Rico (8,990 km²) and the U.S. Virgin Islands (350 km²). (See figure 1.) The mean annual precipitation ranges locally from a high of 5,000 mm within the peaks of Sierra de Luquillo to a minimum of 730 mm along the windward parts of the smaller islands and in southwestern Puerto Rico, which lies in a rain shadow. The annual average precipitation is 1,800 mm in Puerto Rico and 1,061 mm in the U.S. Virgin Islands. Of these amounts, 1,130 mm in Puerto Rico and 990 mm in the U.S. Virgin Islands are lost to evapotranspiration.

Aquifers are a valuable resource in the Caribbean Region (fig. 2). In Puerto Rico, ground-water withdrawals supply about 38 percent of the total water requirements, whereas in the U.S. Virgin Islands they supply 10 percent. Of the ground-water withdrawal of 350 hm^3/yr in Puerto Rico, 54 percent is used for irrigation, 29 percent by industry, and 17 percent for public water supply. Ground-water withdrawal in the U.S. Virgin Islands is about 1.9 hm^3/yr and is almost equally distributed between public supply and privately owned wells. Estimates indicate that by 1985 ground-water pumpage in Puerto Rico will be about 426 hm^3/yr with additional future development potential. Pumpage in the U.S. Virgin Islands may amount to 4.5 hm^3/yr, which is the estimated maximum sustained yield of all aquifers under natural recharge conditions.

The North Coast ground-water province contains Puerto Rico's most productive aquifer, virtually undeveloped until 1968, when an artesian system having a 150-meter head was tapped. Since then, the artesian aquifer has undergone rapid development for industrial water supply. The aquifer in the South Coast ground-water province consists of deep alluvial deposits. This aquifer has been extensively developed for irrigation and industrial water supply but can sustain only minor future development.

In the U.S. Virgin Islands the most extensive aquifer is fragmented igneous rock, but the most productive aquifers are the marl and alluvial deposits of central St. Croix. Although yields from wells are low (less than 6.3 liters per second), the aquifer provides about 0.86 hm^3/yr to public water-supply wells and 0.54 hm^3/yr to private wells. Future development within this aquifer could probably produce an additional 1.0 hm^3/yr under natural infiltration conditions.

Ground-water resources will continue to be important within the region. Optimal use of the water resources can be accomplished through conjunctive use of surface and ground waters and through conservation practices, including artifical recharge and desalination of saline ground water.

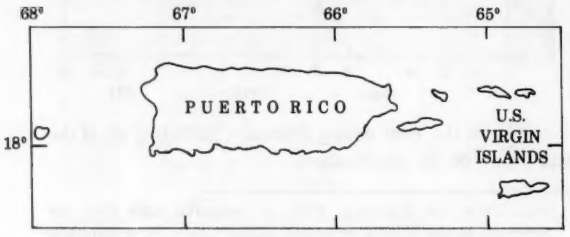

Figure 1.—Map of Puerto Rico and the U.S. Virgin Islands.

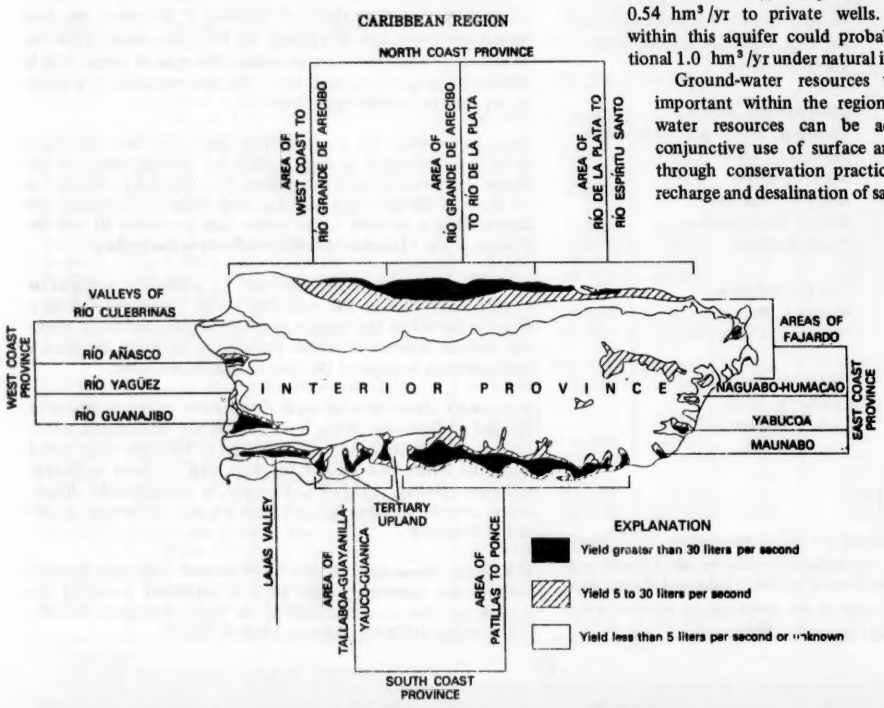

Figure 2.—Ground-water provinces and their yield to wells in Puerto Rico.

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